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AUTHOR Heger, Herbert K.

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ABSTRACT

This paper reports the development of a classroom observation instrument designed to broaden and extend the power of existing tools to provide a balanced, reciprocal perspective of both verbal and nonverbal communication. An introductory section discusses developments in communication analysis. The Miniaturized Total Interaction Analysis System (Mini-TIA) is described as an extension of the Flanders and Galloway techniques which 1) uses time sampling techniques with matrix data interpretation, 2) features reciprocal categories, 3) maintains a reasonable limit on the number of categories for economy and efficiency, and 4) directs observer focus to reception as well as transmission of communication events. A table presents the Mini-TIA categories, seven verbal categories each subdivided into two categories according to the nature of the nonverbal events that parallel the verbal events. Recording with the Mini-TIA system is described, and the major matrix zones are depicted. An observer reliability study is reported in which 39 of 52 preservice teachers trained to use the system achieved a reliability level of .60 or higher, demonstrating that the system is functional and can be taught to observers who can record interaction reliably. Another study is reported which explored the relationship between Mini-TIA data and learner perception of classroom events (as measured by an adjectival checklist), concluding that further study of that relationship is needed. (JS)

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VERBAL AND NONVERBAL CLASSROOM COMMUNICATION: THE DEVELOPMENT OF AN OBSERVATIONAL INSTRUMENT

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Herbert K. Heger
Assistant Professor
College of Education
University of Kentucky
Lexington
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Introduction

Teaching could be defined as the activities of an educator, planned and unplanned, which induce desired behavior and attitudinal outcomes in the learner. Thus conceived, teaching and learning processes are as two sides of a coin: inseparable and mutually interdependent. In fact, one could conclude that there is but one teaching-learning process.

Although the teaching-learning process involves such complexities as the many dimensions of participant behaviors, much research progress has been made with particular aspects of the total process. As in all first generation research, the investigation of the teaching-learning process began with studies of particular aspects of the problem. Certain landmark achievements have been produced:

1. Teaching and learning have been established as researchable subjects.
2. Basic research approaches and techniques have been established.
3. The scope of the problem is now more clearly defined.
4. Much progress has been made in the study of particular aspects of the teaching-learning process and basic data about these dimensions are available.
5. A base for further research efforts has been achieved.

This paper reports on the development of an instrument based upon certain first generation research outcomes which seem to be important keys to the total teaching-learning process.

Some Developments in Communication Analysis

Minter's recent definition of communication is built on the premise that all actions and events have communicative aspects as soon as they are perceived by a human, and that such perception influences the person through changing the information he possesses. (Minter, 1968) The application of this definition to formal education produces a remarkable congruence: the purpose of school is to influence the student through changing the information he possesses. Hence, all education seems to be communication. (It should be obvious that the reverse is not true.) This is supported by the earlier thesis of Mead that people learn through communication, and by the Berlo communication process model. (Mead, 1934, and Berlo, 1960)

The theoretical literature supports the thesis that any analysis of the classroom communication process requires careful consideration of the total or general view of classroom events. Within the general process, certain particular aspects of communication seem to take on importance.

Davitz emphasizes the need to consider the relationship between the verbal and nonverbal dimensions of communication and especially the agreement of these factors. Davidson and Lang have demonstrated that students' nonverbal perception of teachers' attitudes toward themselves affects achievement. (Davidson, Lang, 1960) Galloway has demonstrated that it is possible to analyze this aspect of classroom communication and operational applications of this system have been completed by French and Lail. (Galloway, 1962; French, 1968; Lail,1968)

Flander's hypothesis that indirect teaching behaviors encourage achievement more than direct behaviors has been investigated by many researchers (such as Flanders, Davidson, Hough, et.al.) and it has been established as probably valid and worthy of detailed refinement.

French operationalized an analysis system based upon Task, Institutional, Personal and Mixed events which demonstrated that the analysts of classroom events cannot blandly assume that all events are equally important to the child's development. (French, 1968)

In summary, it seems that among the many dimensions of the teaching-learning process which have been identified, the following are both important and related:

1. The teaching-learning process is a communication process involving both verbal and nonverbal media requiring:

    a. Completeness - reception as well as transmission,
    b. Interaction - participation of all parties,
    c. Nonverbal agreement with and support of verbal events, and
    d. Nonverbal support and encouragement of participation.

2. Indirect and direct teacher behaviors have observably different effects on learning.

3. Classroom events are often related to personal needs of teacher and students, to institutional needs to maintain and support the teaching-learning process, as well as to the main task of the classroom.

While there is a continuing need for further research in each of the above areas, it was felt that for both research and teacher education purposes there was a need to begin the investigation of a larger portion of the total teaching-learning process. If various dimensions seem to be separately important, will their importance increase or decrease when synthesized and investigated together? The first step in the resolution of this question was seen as the development of an observational tool based upon the preceding aspects of the teaching-learning process.

The Mini - TIA System

In order to capitalize on the dimensions of the teaching-learning process listed above, it was determined that the new system should:

1. Use time sampling techniques with matrix data interpretation,
2. Feature reciprocal categories,
3. Maintain a reasonable limit on the number of categories for economy and efficiency and,
4. Direct observer focus to reception as well as transmission of communication events.

The categories of the new system were designed to extend the characteristics of the Flanders and Galloway techniques to the new framework. The resulting observational framework was given the name Miniaturized Total Interaction Analysis System (Mini - TIA).

Table 1 The Mini-TIA CATEGORIES

ROLE		CATEGORY NUMBER	Verbal Events	Nonverbal Events
The teacher's role in personal development of the students		1	REINFORCEMENT BY THE TEACHER: Teacher accepts student feeling, praises, encourages student. Any teacher expression reinforcing student except use of student idea.	+ vs - Sincere vs Insincere Supportive vs Non-supportive Appropriate vs Excessive
		2	USE OF STUDENT IDEA BY THE TEACHER: Significant development of idea first introduced by a student. More than a mere repetition of idea.	+ vs - Implementing vs Perfunctory Sincere vs Insincere Supportive vs Non-supportive Appropriate vs Excessive
	The teaching role	3	CONTENT PRESENTATION BY TEACHER: Teacher lectures and questions.	+ vs - Spirited vs Monotonous Responsive vs Unresponsive Congenial vs Uncongenial
	The institutional role	4	CONTROL OF STUDENTS BY TEACHER: Teacher directs, commands, orders, corrects, criticizes or justifies authority.	+ vs - Facilitating vs Punitive Adjusting vs Corrective Concerned vs Distainful

Table 1 (Continued)

ROLE	CATEGORY NUMBER	Verbal Events	Nonverbal Events
The learning role	5	STUDENT TALK ABOUT CONTENT: All student talk which is relevant to student learning whether directly connected to lesson pattern or not.	+ vs - Responsive vs Unresponsible Supportive vs Non-supportive Eliciting vs Supressing
The personal growth role	6	STUDENT TALK ABOUT PERSONAL NEEDS: All student talk which is unrelated to any cognative learning but which relates to personal needs, desires, wants, or frustrations.	+ vs - Supportive vs Non-supportive Eliciting vs Supressing Concerned vs Distainful
	7	SILENCE OR MULTIPLE TALKING:	+ vs - Comfort vs Distress Purposeful vs Aimless Productive vs Non-productive

Note that each of the verbal categories is subdivided into two catagories according to the nature of the nonverbal events that parallel the verbal events. Hence there are 14 categories in the system: 1+, 1-, 2+, 2-, etc.

Mini-TIA provides the educator with a technique for constructing a representation of the condition of classroom interaction which is somewhat analagous to medical techniques of building an image of the condition of a patient's heart. The physician develops an image of the heart's condition without direct examination. Rather, he observes blood pressure and listens to the sounds of the patient's chest and synthesizes the image of the heart's condition from this observable evidence. With classroom communication direct observation is impossible at the current state of educational research. We know that interaction is that mysterious zone between the sender and receiver, but we cannot see it.

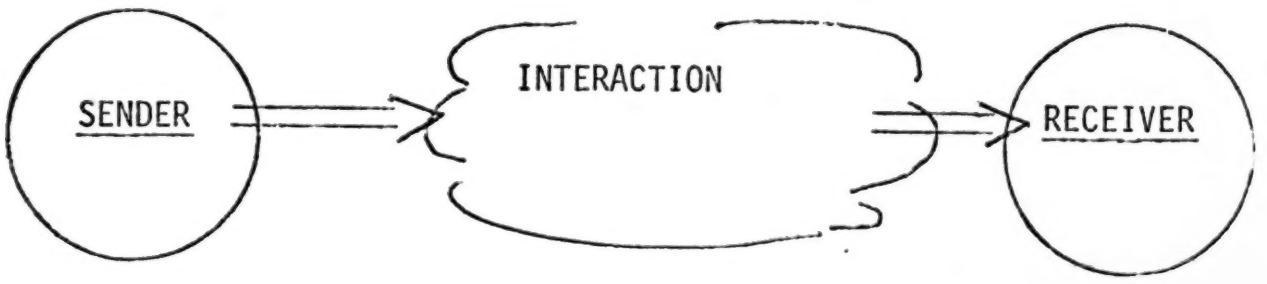


Figure 1 A Representation of Communication

Yet it is possible to observe symptoms of communication: symptoms which take the form of behaviors at the two ends of the interaction chair. The behaviors of the sender and of the receiver are symptomatic of the interaction and provide indications of the nature and effect of the communication. Mini-TIA establishes a conceptual framework for the observation and recording of the symptomatic behaviors of the teacher and of the class thereby providing a means for the evaluation of the classroom interaction process.

The medium of interpersonal communication is composed of two components which are defined for the purpose of Mini-TIA as verbal and nonverbal. The precise definitions of these terms is critically important because the terms do not merely refer to spoken and unspoken interaction. The term verbal can be defined as that which consists of or has to do with words, only. Nothing in Webster's definition allows for the inclusion of intonations in the delivery of the words. By contrast, nonverbal interaction is more than the gestures and mannerisms which accompany the words. Nonverbal interaction includes the intonations of delivery as well as those mannerisms which are commonly recognized as nonverbal.

Verbal interaction includes only the denotative meaning of the words used in the total interaction. Langer's concept of discursive communication matches the verbal dimension of interaction (Davitz, p. 38). Discursive communication is that communication which possesses clearly defined meaning, syntax, and order.

Although Langer's definition of the complementary phase of communication has been questioned, her main criterion of nondiscursive communication serves the nonverbal phase of interaction well. The content of this phase is interpreted on an intuitive basis. That is, the nonverbal component of interaction is the less formal and less rigid area of gestures, mannerisms, intonations, inflections and manipulations of pace. This is the component which carries much of the emotional message of the interaction.

The definition of verbal and nonverbal does not correspond to the aural and visual dimensions of interaction. Nonverbal interaction includes all of the visual dimension and, in addition, includes certain affective portions of the aural dimension such as inflections. Verbal interaction is restricted to the formal language used in the message.

It is interesting to note that teacher and pupil, alike, are conditioned to restrain their verbal utterances and communicate only a portion of their intent in this dimension. The nonverbal expression, by contrast, is a much more open mode of interaction in which teacher and student more nearly reveal their true feelings or intent. Hence, the nonverbal dimension of communication can provide greater depth in meaning than the verbal and thereby provides a potent resource for behavior and communication analysis.

Recording with Mini - TIA

Recording with the Mini - TIA system requires observer training on the order of conventional interaction analysis training. Certain points are unique to Mini - TIA, however. The observer must understand the difference between verbal and nonverbal communication and he must pay special attention to completeness of communication. Both of these factors seem to present problems to some observers. In fact, in some cases special attention must be given to observer failure to watch as well as listen.

The Mini - TIA observer records a sample of the classroom interaction every three seconds for the duration of the lesson. It is not necessary, however, to make a detailed and instanteous judgment each three seconds; the concern of the observer is with EVENTS rather than microscopic mannerisms. Therefore, the observer may record a series of dots until he is absolutely certain of the proper category designation. Then he records the category symbol. The sample in Figure 2 demonstrates how an observer has left dots where the event continued and before he made his judgment of the proper category designation. Each sequence of dots has the category designation of the first number of dots.

Notice that the recorded columns are 20 tallies long. At three seconds per tally each column represents one minute of classroom interaction thereby providing a convenient method of locating tallies and or particular bits of interaction. The sample in Figure 2 is two minutes three seconds long.

Once the interaction has been recorded in tally form the numbers are paired so that they may be recorded in the Mini-TIA matrix. The first number of each pair is placed in the row of the matrix and the second number represents the column of the matrix. In the sample the number pairs are 7-, 3-; 3-, 3+; 3+, 3+ and so forth. The first pair (7-,3-) is recorded in the 7- row and the 3- column. After all tallies have been recorded a total for each row and column is computed. The row and column totals match providing a means of checking the matrix construction process. The percentages and evaluation formulae are then constructed.

Figure 2

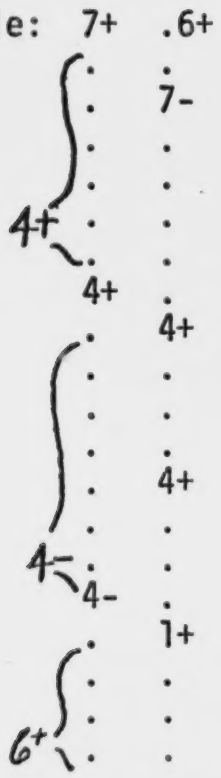
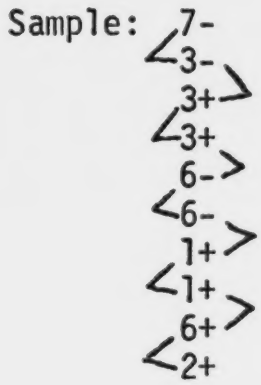


Figure 3



Mini-TIA Statistics

1. Summary percentages:

   a. Positive personal development: Add percentages in 1+, 2+, 6+
   b. Negative personal development: Add percentages in 1-, 2-, 6-
   c. Positive content transmission: Add percentages in 3+, 5+
   d. Negative content transmission: Add percentages in 3-, 5-
   e. Positive control: 4+ alone
   f. Negative control: 4- alone
   g. Positive silence: 7+ alone
   h. Negative silence: 7- alone

2. P/C Ratio
   Ratio of positive personal development to control:

$$PC = \frac{\Sigma (1+), (2+), (6+)}{\Sigma (4+), (4-)}$$

3. Percentage of Teacher Congruence

$$TC = \frac{\Sigma (1+), (2+), (3+), (4+)}{\text{Total teacher talk}} \times 100$$

4. Percentage of Teacher Elicitation Effort

$$EE = \frac{\Sigma (1+), (2+)}{\text{total teacher talk}} \times 100$$

5. Elicitation Response Ratio

$$ER = \frac{\Sigma\ (1+),\ (2+)}{\Sigma\ (5+),\ (6+)}$$

	1+	2+	6+	1-	2-	6-	3+	5+	3-	5-	4+	4-	7+	7-	T
1+															
2+		PERSONAL DEVELOPMENT ZONE					PERSONAL DEVELOPMENT FOLLOWED BY CONTENT				PERS. DEV. FOLL-OWED BY CONTRO				
6+															
1-															
2-															
6-															
3+		CONTENT FOLLOWED BY PERSONAL DEVELOPMENT					CONTENT TRANSMISSION ZONE				CONTENT FOLL-OWED BY CONTROL				
5+															
3-															
5-															
4+		CONTROL FOLLOWED BY PERS. DEV.					CONTROL FOLLOWED BY CONTENT				CONTROL ZONE				
4-															
7+															
7-															
T															
%															

Figure 4 Major Mini-TIA Matrix Zones

The Observer Reliability Study

Introduction

An important characteristic of an analytical instrument is the quality of inter-professional communication which the system engenders. The data produced by an analytical system must be understood by the people utilizing it. In part this is why all particular applications of such devices should begin with a check on the operational state of the tool. Checks of this type usually end with a reliability check to confirm observer mastery of the system.

Initial studies of the operational state of analytical systems should focus on the identification of basic characteristics and upon the teachability of the system. Variations in conditions surrounding subsequent applications of such devices preclude over-extension of these studies.

The achievement of inter-observer reliability can be taken as confirmation of observer mastery of the observational device. If a group of observers can encode data with appropriate levels of agreement one may conclude that the observers have reached an understanding of the system. Thus, the teachability of the system is, in general, confirmed.

By contrast, if the group of observers fail to achieve satisfactorily reliability levels, no immediate identification of the cause is possible. The absence of agreement can imply weakness in the basic concept of the system, inadequate category definitions, poor training of observers or any of several other difficulties.

The use of inter-observer reliability as a check on the operational state and teachability of an analytical framework is satisfactory as long as the results of the reliability study are favorable. If, by chance, the results are negative, further studies would be necessary to determine the cause of the failure.

The Setting

The Education 435 staff at The Ohio State University began incorporating video taping into an already sophisticated general secondary methods course during the Fall Quarter, 1967. The course had incorporated simulated teaching experience and student self-analysis with the Flanders Interaction Analysis System since the developmental research carried out by Hough in 1963. (Amidon and Hough, 1967). The extension of audio recording techniques to the video dimension resulted largely from the increased economy of video recording equipment. However, the problems of integrating this new tool into the course seemed to demand a new approach to the analysis of feedback data.

Johnson reported on the effects of video taped feedback on students. Her results seemed to confirm the experience of the Education 435 staff. The students

had been very enthusiastic about videotaping, but their attention seemed to be on the cosmetic rather than the significant characteristics of the recorded events. (Johnson, 1968). This problem resulted in the development of Mini-TIA.

The initial application of Mini-TIA was in two sections of Education 435 taught by this researcher during the Spring Quarter, 1968. The course differed from other Education 435 sections taught by this investigator primarily in the substitution of the videorecorder for the audio recorder and in the substitution of Mini-TIA for the Flanders System.

The Procedure

Students in Education 435 are typically required by their instructors to practice the Flanders System until they can achieve a reliability level of .60. The students are permitted to repeat reliability efforts until they succeed. Only on rare occasions does a student fail to reach reliability with the Flanders System; and these cases usually involve a student with academic problems in other phases of the course as well as with interaction analysis.

The procedure followed in teaching Mini-TIA was similar to that used with the Flanders instrument. However, instead of permitting endless repetition of reliability attempts, students were required only to make a single attempt to achieve reliability on a fifteen minute tape they had not previously seen. Failure to achieve reliability had no effect on the students' academic standing. For the purpose of this study, no value could be seen in repeated encodings of the same tape, nor in enforced achievement of reliability.

The students were taught the fundamentals of Mini-TIA through the use of a manual, lectures, demonstrations and group practice sessions. Students received formal instruction with the use of critical incident motion pictures, video tapes and in certain cases audio tapes. Timing practice was a part of the formal instruction and students were encouraged to practice the technique in classes they attended and in watching television. Instruction and group practice took about six class hours. The decision concerning readiness for the reliability check was made by the group and was not a decision of the instructor.

The reliability data was taken after a five minute warm-up session. A fifteen minute episode of a seventh grade science lesson taught by a male instructor was utilized for the reliability check. The subjects encoded the interaction on the first viewing of the lesson. No rerun of the lesson nor any change in tally data was permitted.

The subjects for this experiment were typical Education 435 students. These pre-service teachers are usually juniors representing such diverse academic interests as art, music, and the traditional disciplines. There was a total of fifty-two students in the classes included in the study.

Selection of subjects was essentially random. The normal registration process was followed. It involves the random assignment of students to certain Education 435 time slots, the random assignment of instructors and an anonymously executed section balancing procedure. In this course every effort is made to have the same proportion of students representing each academic area in each section. Therefore, the students are sorted into sections by the staff on the first day of the class. Hence, the group of fifty-two subjects represented a balanced distribution of students from most major areas.

Inter-Observer Reliability Calculations

The degree of inter-observer agreement was determined by computation of the percentage of agreement of the subject's data with the data produced by the instructor's encoding of the same episode. The formula was $P_o = 1 - \frac{\Sigma D}{T}$ where the ΣD represents the summation of all tally deviations and T represents the appropriate number of tallies for the particular episode.

Data

Of the 52 subjects, 39 achieved reliability at the same level required of students utilizing the Flanders method. These students achieved a P_o of .60 or higher on a one-time viewing of the lesson. Five of the subjects did not achieve reliability but were following the appropriate technique. In eight cases there was such substantial deviation from proper timing as to invalidate the data. Complete reliability data is presented in Table 2.

Findings

The experiment with the Mini-TIA system in Education 435 demonstrated that the system is functional, it can be taught to observers, and they, in turn, can record interaction reliably. Thirty nine of the fifty-two subjects voluntarily achieved a reliability level of .60 or higher on a single viewing of a complex fifteen minute lesson.

Interviews and other informal means of assessing student response to the potential utility of the Mini-TIA technique revealed a generally favorable opinion of the system and of the learnings that occurred. No objective data is available on the type and kind of learnings about classroom communication which took place.

The students prepared formal Mini-TIA analyses of their simulated teaching experiences. Their reports indicated a general understanding of the Mini-TIA concepts and an ability to profit from the analysis of the Mini-TIA data. These reports also confirmed the positive opinions expressed by subjects in private interviews with the researcher. The data produced by the students during their self-analysis also indicated that no communication event occurred which could not be appropriately encoded with the system.

Table 2 Inter-Observer Reliability Data

Class Section A		Class Section B	
Student	P_o	Student	P_o
1	.77	25	.57
2	.85	26	.71
3	.81	27	.59
4	.84	28	---timing
5	---timing	29	.81
6	.69	30	---timing
7	.84	31	---timing
8	.62	32	.68
9	.62	33	.65
10	.69	34	---timing
11	.64	35	---timing
12	.73	36	.68
13	---timing	37	.71
14	.70	38	.70
15	.69	39	.70
16	.43	40	.64
17	.77	41	.72
18	.72	42	.75
19	.62	43	.63
20	.51	44	.74
21	.70	45	.62
22	.60	46	.76
23	.69	47	.66
24	.75	48	.65
		49	.65
		50	.54
		51	.70
		52	---timing

Summary: 39 subjects achieved $P_o \geq .60$
5 subjects achieved $P_o < .60$
8 subjects failed to achieve timing accuracy

Relating Mini-TIA Data to Learner Perception of Events

Introduction

Most analytical tools are validated by means of the internal consistency of the categories of the system, such consistency being determined by reliability studies. But external validation of such systems has not been pursued with appropriate vigor. In the study of the teaching-learning process, the specific behaviors of teachers are less important than the effects of these behaviors. It is important to know whether a researcher can sympathetically identify behaviors, so that the resulting model will be related to student reality.

The problem of establishing relationships between models of teacher behavior and learner reality grows in importance as research concern shifts from the obvious to the subtle. An analytical tool which categorizes such behaviors as "pointing", "earlobe pulling", and "nose twitching" would cause little difficulty with external validity. A research result showing, for example, that teachers tend to point a minimum of 75 times per lesson could not be challenged. But an analytical system which attempts to categorize "task pointing", "supportive pointing", and "repressive pointing" could not produce validated results until the modifiers "task", "supportive", and "repressive" were adequately defined. Ultimately, these definitions would have to be established with respect to student perception. "Repressive", for example, has no meaning without due consideration of the student. Further, no educator could apply such a system without prior validation in terms of observer ability to determine when a behavior becomes repressive from the student's point of view. This fact, when coupled with the wide range of individual differences of students, would require a series of validation studies with any system of teacher-pointing analysis. This problem, it should be noted, is most important in the case of systems dealing with affective events and is somewhat less important in purely cognitive situations. Mini-TIA is a system dealing with affective communication, hence external validation becomes important.

No prior research could be found dealing specifically with the question of student perception of teaching behavior in a way that established a relationship between student reality and analytical descriptions of interaction. There are, however, several important research studies dealing with general student perception of teaching. These studies , reviewed in Chapter II, tend to confirm the importance of the student's view of interaction.

One of the reasons for the lack of research into external validation of observational frameworks is the difficulty of the topic. Such research must account for all of the social personal, and academic variables between students, demonstrate how the analytical procedure under study can account for all such variables and provide parameters for the adjustment and interpretation of the system-produced data.

Mini-TIA shows promise in the area of total communication analysis, but the problem of external validation still provides the most important barrier to the use of the new system in studies of teaching and learning. It was necessary, therefore, to formulate an initial approach to the external validation of the present tool, to test the validation procedure, and to utilize the resulting data to critique the initial design. It was anticipated that progress could be made toward subsequent studies of this problem.

Design

The data produced through the use of an observational system by a trained observer is based upon communication events of the classroom and these data tend to be closely related to actual phenomena. These data tend to be objective and relatively unbiased by emotion. Yet, students who are participating in the lesson are emotionally involved and do not base their reactions to the lesson on purely objective data. The student responds affectively to classroom communication events.

Despite the complexity of student response, the external validation of an analytical tool requires consideration of the impact of communication events. This problem is especially important to a system of analysis such as Mini-TIA since it deals with the affective nonverbal dimension of communication.

Communication events are the sum of communication transmittal behaviors, both verbal and nonverbal. It can be argued that the event, especially in the nonverbal dimension, can be more than the sum of the component behaviors, but with Mini-TIA this problem is minimized because observers focus upon the total event rather than upon minute or specific transmittal behaviors. As Mini-TIA is utilized, observers carefully record the nature of the communication events which occur. The students, who are participating in the same lesson, observe the same events, but unlike trained observers, respond in an affective manner. Hence, a teacher-created event can be diagrammed as shown in Figure 5.

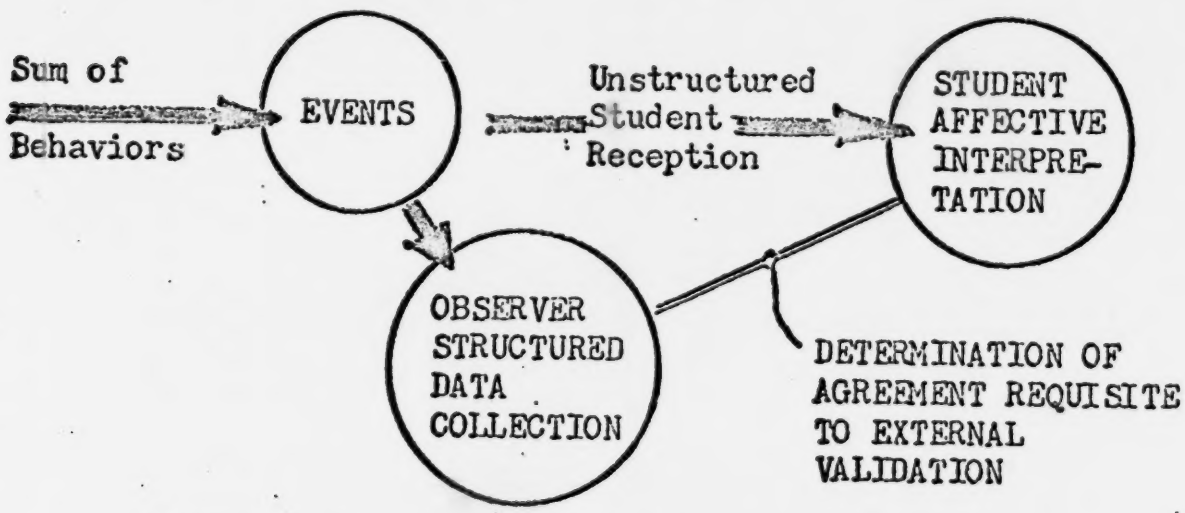


Figure 5 Teacher Initiated Communication Event

A student initiated communication event has characteristics similar to those shown in Figure 5 but validation of these events is less difficult since Mini-TIA observers are educators who have a reasonably strong ability to interpret the decoding processes of other teachers.

There are several important important variables present in the above diagram of teacher produced communication events. Perhaps the most important are:

(1) The multiplicity of students, each with a unique perceptual screen,
(2) The presence of a non-student observer with a patently different perceptual screen from that of the students, and
(3) The use of a particular observational system as a data collecting device.

Eventually these three variables, and others, will have to be separately investigated; but there are too many variables in the above diagram for a first stage study of external validation of the present instrument. Therefore, a simplified design will be used which will focus on just one variable: Mini-TIA. The design is illustrated in Figure 6.

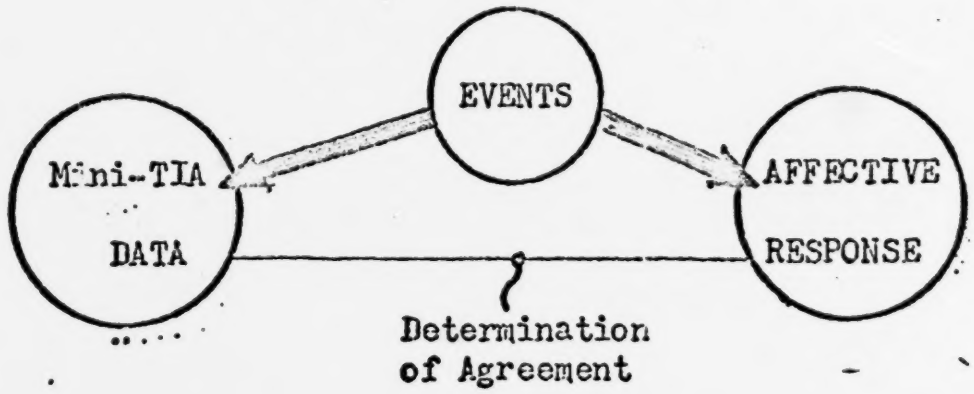


Figure 6 Objective Data vs. Affective Response to A Communication Event

The problem investigated here was: What kind of relationship exists between the Mini-TIA data and the affective response to classroom communication events when observers are held constant? How does the affective response, as measured by an adjectival checklist correspond to the data produced by the same persons using Mini-TIA?

If a positive relationship can be established between Mini-TIA data and the affective response of the same persons, then it would be possible to extend the investigation of the external validation problem by administering an adjective

checklist to selected groups of students and comparing the results with observer collected Mini-TIA data. However, a significant relationship must be established between the two instruments prior to such a study. It is the possibility of such a relationship that is the subject of the present study.

Procedure

The Davidson-Lang checklist was selected to measure the subjects' affective response to the sample lesson. This tool was chosen because of the intensive developmental work it had undergone. The checklist was used to produce significant results in the area of student perception of teaching and these results seemed closely related to the affective nature of the current investigation (Davidson and Lang, 1960). Further this instrument was utilized by Galloway in his first major nonverbal study. (Galloway, 1962) In addition the checklist bears close conceptual relationship to Mini-TIA.

A slight revision was made to the D-L instrument to include three additional items relating to the indirect-direct concept of the verbal dimension of Mini-TIA. The complete instrument is appended to this report. Two episodes were selected from a library of randomly selected video taped junior high lessons. One episode was a portion of a seventh grade English lesson and the other was a portion of a science class.

Both video tapes were recorded with only one camera resulting in primary focus on the teacher with about one third of the student "on camera" at all times. No zoom lens or special effects were utilized. Hence, the final images closely approximated the view of one observer seated at the side of the room about half-way to the rear.

A group of nine subjects was randomly selected from The Ohio State University freshman class. These students were more than a year away from declaring a major and taking their first methods courses as pre-service teachers, although these students were considering a career in education as evidenced by the fact that they were enrolled in Education 108, an introductory survey course intended to assist students select their profession. All students were volunteers.

The students were given a general introduction to the experiment. Nothing was included in the introduction relating to the nature of the Mini-TIA technique, nor to the kind of skills they would subsequently apply. The students viewed the sample tapes and responded immediately with the Davidson-Lang checklist. Then the students were instructed in the use of the Mini-TIA system. They were given a week to learn the system and practice the Mini-TIA recording skill. Then they recorded the interaction on the same lesson samples. Subsequently an open discussion was held and informal written reports were prepared by the subjects. The discussion and the reports were very unstructured, but the students were encouraged to comment on the use of the analytical system and on the nature of the two lessons viewed.

1. Differences in the lessons as revealed by the Mini-TIA data.

Table 3 Selected Verbal Mini-TIA Data

Mean Percent of Lesson Spent in:	English Lesson	Science Lesson
Teacher Presentation	66.9%	83.2%
Control, Directions	6.3%	5.9%
Silence, Confusion	14.5%	5.6%

The verbal categories revealed little difference between the two lessons observed, except that more time was spent in teacher-talk in the science lesson (Table 3). This difference is accounted for, to a large degree, by the fact that category 3 includes all teacher presentation of information, whether verbally or by demonstration. In this case the science lesson included a significant portion of demonstration with reptiles thereby raising the category three total.

Table 4 Selected Nonverbal Mini-TIA Data

Mean Percent of Time in Negative Nonverbal Categories	English Lesson	Science Lesson
Overall Lesson	19.8%	4.6%
Categories 1, 2, 3, 4 (Teacher Talk)	14.7%	1.1%
Category 3: Content Presentation	11.8%	0.9%
Category 4: Directions, Control	39.6%	9.1%
Category 7: Silence, Confusion, Etc.	59.3%	41.6%

The nonverbal Mini-TIA categories revealed significant differences between the two lessons (Table 4). The English lesson clearly seemed to include a greater amount of incongruence, stress and negative nonverbal elements. This data was supported by informal reports of the observers who found the English lesson generally boring and felt that the level of student attention during the lesson

was very low. While no general research data is available on appropriate levels of negative nonverbal events with the Mini-TIA system, it is clear that there was a significantly higher incidence of negative events in the English lesson.

2. Differences in the lesson as revealed by the Davidson-Lang checklist.

The subjects rated the instructors of the two lessons with the D-L instrument after one viewing of the video tapes and before learning to apply Mini-TIA. The items on the checklist were mixed in terms of value. That is, the more positive characteristic was not always to the left; sometimes the more valued trait is to the right of the list. After administration the data was reordered so that the positive trait was always on the same side and the observer ratings were computed on a scale from 1 (poor) to 5 (excellent). The mean overall rating for the English lesson was 3.06 while the other lesson received a mean rating of 3.71.

In other words, the science lesson was given a mean ration of 0.65 more than the English lesson. The English lesson was rated higher than the science lesson on seven of the twenty-seven individual items, but none of these even approached the magnitude of the overall mean difference. By contrast, nineteen of the items differed in favor of the science lesson, and thirteen of these were of a magnitude greater than the cumulative mean.

The results of the D-L checklist, as shown in Table 5 seems to show the science teacher to be generally viewed more favorably in a nonverbal sense.

Table 5 Davidson-Lang Checklist Results

Rank	Item	Mean Difference (In favor of the Science Lesson)
1.	Popular - Unpopular	2.00
2.	Curious - Indifferent	1.89
3.5	Polite - Rude	1.67
3.5	Respectful - Disrespectful	1.67
5.	Friendly - Unfriendly	1.66
7.	Flexible - Rigid	1.56
7.	Nice - Awful	1.56
7.	Kind - Cruel	1.56
9.	Happy - Sad	1.44
10.	Fair - Unfair	1.22
11.5	Credible - Deceitful	1.00
11.5	Daring - Afraid	1.00
13.	Graceful - Awkward	.66

It is believed that a detailed item analysis of the D-L results would be inappropriate since the development of the tool was based upon the use of summary scores.

3. The relationship between affective observer response and Mini-TIA data.

The problem was to establish a relationship between the two instruments. The difference revealed by both tools favor the science lesson. The proportion of negative teacher talk is only 1.1% in the science episode while is it 14.7% in the English session. The D-L rating of the science lesson is more favorable (3.71) than that of the English lesson (3.06). Figure 5 shows the relationship between these figures.

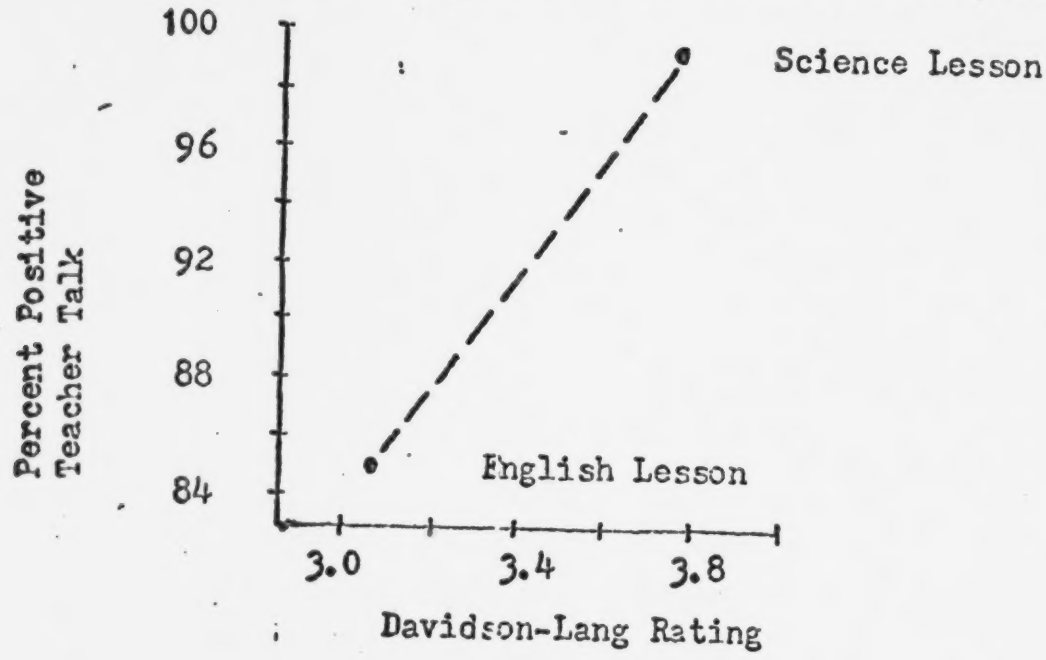


Figure 5 Possible Relationship Between Mini-TIA and the D - L Checklist

(The percent negative teacher-talk has been replaced by percent positive teacher-talk). There are not enough lesson samples to enable the plotting of a graphic relationship, but if more episodes had been analyzed a relationship might have been established.

Correlations between the Mini-TIA data and the D-L data were computed. Due to the difference in measurement types between the two instruments the Spearman rank-order correlation was selected as the most appropriate statistic (Siegel, p. 203). The computation produced a correlation of (r_S) .571 which approached significance at the .05 level. Due to the closeness of the result other correlation formulae were applied to check these results. Rho (Garrett, p. 143) produced identical results (ρ = .571).

Findings

While the D-L checklist and the Mini-TIA system both indicated, on average, similar differences between the science and English lessons the relationship did not hold up under the statistical tests applied. The data do not indicate a maturely developed connection between the Davidson-Lang checklist and the Mini-TIA system.

Conclusions and Discussion

The findings of the study led to certain general conclusions regarding the developmental state of the Mini-TIA instrument.

Conclusion 1. The Mini-TIA system is an operational tool which broadens and extends the power of existing tools. This system successfully provides a balanced, reciprocal perspective of both verbal and nonverbal communication.

Conclusion 2. The Mini-TIA system has not been successfully related to the learner's perception of communication events and further study of this problem is needed.

As the conclusions indicate, it is contended that Mini-TIA does meet the rigorous requirements of communication theory and existing teacher behavior research. This tool shows potential for consideration of the client's view of communication events because the observer's attention is on the total interaction process rather than on teacher behavior. This system operationalizes a nonverbal dimension to compliment and extend the customary verbal analysis, and this new framework is reciprocal; it gives equal attention to student behavior and to teacher behavior. Therefore, the tool formulated in this study is a significant improvement on existing devices. It has been confirmed that this system is operational.

Mini-TIA is an improvement, but it is no panacea for researchers into the teaching-learning process: significant limitations to this system were uncovered during this study. Some of the more important limitations of the system are:

1. Mini-TIA is essentially a large-group framework. The concept and research background arose from research on large group instruction. It is believed that the reciprocal categories will permit application of this tool to small group instruction and even to one-to-one counseling sessions. These applications of Mini-TIA have not yet been made, so there is no data on the potential of this system in these areas.

2. Mini-TIA is a time-sampling analytical device. Communication events are sampled periodically at three second intervals. Each encoded event is given the same importance. When certain events assume more importance than others time sampling systems cannot account for the difference.

3. External validation of this system is needed.

Recommendations for Further Research

1. A series of studies relating learning perception of classroom communication events to data produced by analytical systems is needed. The final phase of the present study should be repeated with a larger sample of classroom episodes, more observers and improved variable control. A verbally oriented instrument to complement the Davidson-Lang checklist could be utilized. Studies relating perceptions of students from various cultural settings to data produced by systems like Mini-TIA are necessary.

2. Investigations of the limitations of time-sampling procedures should be conducted. Not every event is of equal importance, but time-sampling systems treat all events equally. Means of accounting for episodes of great emotional intensity are needed.

3. Investigations of the interaction cycles revealed by the Mini-TIA matrix are needed. How does the various cycles relate to planned teacher strategy and to student achievement?

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